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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,657	02/27/2004	Lei Shao	042390.P16330X	3606
45209	7590	06/24/2008		
INTEL/BLAKELY 1279 OAKMEAD PARKWAY SUNNYVALE, CA 94085-4040			EXAMINER MURPHY, RHONDA L	
			ART UNIT	PAPER NUMBER
			2616	
			MAIL DATE	DELIVERY MODE
			06/24/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/788,657	<b>Applicant(s)</b> SHAO ET AL.	
	<b>Examiner</b> RHONDA MURPHY	<b>Art Unit</b> 2616	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 5/21/08.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 30-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 30-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This communication is responsive to the Request for Continued Examination (RCE) filed on 5/21/08. Accordingly, claims 1-29 have been canceled and claims 30-44 are currently pending in this application.

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/21/08 has been entered.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 30 – 44 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 30 - 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. ("A Space-Frequency Transmitter Diversity Technique for OFDM systems", Globecom 2000, IEEE Global Telecommunications Conference; November 27, 2000) in view of Giannakis et al. (US 7,224,744).

**Regarding claims 30, 35 and 40**, Lee teaches a system comprising: a number  $M$  of omnidirectional antennas ( $Tx1$  and  $TX2$  in fig. 2); and a diversity agent, to receive content for transmission via a multicarrier wireless communication channel ( $X(m)$  in fig. 2. *It would be inherent to have a receiver to receive the symbol*), wherein the received content is a vector of input symbols ( $s$ ) of size  $N_c \times 1$  (pg. 1474, right column, first paragraph), wherein  $N_c$  is the number of subcarriers of the multicarrier wireless communication channel (equation (1),  $X_0(n)-X_{I^*}(n) \dots X_{N-2}(n)-X_{N-1^*}(n)$  and  $X_I(n) \dots X_{N-2^*}(n)$  are interpreted to be corresponding to the number of subcarriers), and to generate a rate-one (equation (1) on pg. 1474), space-frequency code matrix (matrix  $G2$  on pg.

1474) from the received content for transmission on the multicarrier wireless communication channel from at least a subset of the M omnidirectional antennas ( $Tx_1$  and  $Tx_2$  in fig. 2).

Lee fails to explicitly disclose dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors ( $V_g$ ), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of  $N_G$  subcarrier spacings.

However, Giannakis teaches dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors ( $V_g$ ) (col.9, lines 1-15; col. 10, lines 15-23), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of  $N_G$  subcarrier spacings (col. 10, lines 24-42).

In view of this, it would have been obvious to one skilled in the art to divide the symbols into groups and multiply by a constellation rotation precoder, in order to maximize the signal level at the antenna.

**Regarding claims 31, 36 and 41**, the combined system of Lee and Giannakis teach a system according to claim 40. Giannakis further teaches the diversity agent further comprising: a space-frequency encoding element, responsive to the pre-coder element, to divide each of the pre-coded vectors into a number of  $L_M \times 1$  subvectors, and to

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create an  $M \times M$  diagonal matrix  $= D_{sg,k} = \text{diag}\{\Theta^{TM \times (k-1)} + 1S_g, \dots, \Theta^{TM \times k} S_g\}$ , where  $k=1 \dots L$  from the subvectors (col. 9, lines 45-60; col. 10, lines 15-23).

**Regarding claims 32, 37 and 42**, the combined system of Lee and Giannakis teach a system according to claim 40. Giannakis further teaches a system according to claim 41, wherein the space-frequency encoding element interleaves the  $L$  submatrices from the  $G$  groups to generate an  $M \times N_c$  space-frequency matrix (col. 9, lines 32-55).

**Regarding claims 33, 38 and 43**, Lee teaches a system according to claim 42, wherein the space-frequency matrix provides MNL channel diversity (pg. 1477, section V in Lee. Two-branch SF-OFDM transmitter diversity), while preserving a code rate of 1 for any number of transmit antenna(s)  $M$ , receive antenna(s)  $N$  and channel tap(s)  $L$  (pg. 1477, section V. Unity coding rate is interpreted as a code rate of 1).

**Regarding claims 34, 39 and 44**, Lee teaches a system according to claim 40, wherein the space-frequency matrix provides MNL channel diversity (pg. 1477, section V in Lee. Two-branch SF-OFDM transmitter diversity), while preserving a code rate of 1 for any number of transmit antenna(s)  $M$ , receive antenna(s)  $N$  and channel tap(s)  $L$  (pg. 1477, section V. Unity coding rate is interpreted as a code rate of 1).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RHONDA MURPHY whose telephone number is (571)272-3185. The examiner can normally be reached on Monday - Friday 9:00 - 5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on (571) 272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rhonda Murphy  
Examiner  
Art Unit 2616

/R. M./  
Examiner, Art Unit 2616

/FIRMIN BACKER/  
Supervisory Patent Examiner, Art Unit 2616